CLAIMS:

The invention claimed is:

1.   An apparatus for designing a filter to be rendered on a programmable circuit device capable of realizing at least one filter design by wiring together at least one filter component, comprising:

a programmable computing device;

a user interface associated with the programmable computing device; and

a design tool associated with the programmable computing device and configured for interaction with a user at the user interface, the design tool comprising computer program code embodied in the programmable computing device including at least one filter sub-circuit definition for rendering a filter design and containing information for defining at least one of multiple configurations, topologies, and parameters of the filter design via the at least one sub-circuit definition for a programmable circuit device;

wherein the user interface is configured to enable a user to select and apply input parameters to the filter design and dynamically receive display of at least one of filter response, poles required, and evaluation of sub-circuit parameters so a user can optimize input parameters for a desired filter design.

2.   The apparatus of claim 1 wherein the user interface is configured to enable a user to select and apply filter specifications into filter design software.

3.   The apparatus of claim 1 wherein the user interface is configured to enable a user to inspect a Bode plot filter performance prediction of the filter design.

4.   The apparatus of claim 3 wherein the user interface is configured to enable a user to change at least one defining parameter for the Bode plot.

5.   The apparatus of claim 4 wherein the user interface enables a user to view the changed Bode plot.

6.   The apparatus of claim 4 wherein one defining parameter comprises ripple.

7.   The apparatus of claim 4 wherein one defining parameter comprises overall gain.

8.   The apparatus of claim 4 wherein one defining parameter comprises corner frequency.

9.   The apparatus of claim 4 wherein one defining parameter comprises filter response.

10.   The apparatus of claim 4 wherein one defining parameter comprises stop frequency.

11.   The apparatus of claim 4 wherein one defining parameter comprises attenuation.

12.   The apparatus of claim 4 wherein the defining parameter corresponds with a parameter line on a Bode plot, and a user drags the parameter line to a desired location on the Bode plot to apply a new input parameter to the filter design.

13.   The apparatus of claim 12 wherein the user interface enables a user to dynamically view the parameter line and the Bode plot.

14.   The apparatus of claim 12 wherein the parameter line corresponds with a CAM parameter limit.

15.   A method of designing a circuit using a programmable circuit device, comprising:

providing a programmable computer with a user interface, a design tool and sub-circuit definitions for filter circuit components;

with the programmable computer and the user interface, generating a filter performance prediction;

applying one or more input parameters to the filter performance prediction via the user interface; and

displaying at least one of filter response, poles required, and evaluation of sub-circuit parameters in response to a change in input parameters.

16.   The method of claim 15 further comprising inputting one of a filter specification and a filter parameter to the programmable computer using the user interface.

17. The method of claim 16 wherein the filter parameter comprises a configurable analog module (CAM) parameter limit.

18. The method of claim 17 wherein a plurality of configurable analog modules are wired together via the user interface to provide a filter design based upon the filter performance prediction.

19. The method of claim 15 wherein applying comprises implementing interactive computing drag and drop techniques via the user interface to apply the input parameters.

20. The method of claim 19 wherein implementing comprises modifying at least one input parameter.

21. The method of claim 20 further comprising generating a Bode plot in response to modifying at least one input parameter.

22. The method of claim 21 further comprising observing the Bode plot generated in response to modifying the at least one parameter.

23. The method of claim 22 wherein modifying and generating occur nearly simultaneously in time.

24.   A method of synthesizing a circuit approximation, comprising:

providing a user interface, a programmable computing device, and a circuit design tool associated with the programmable computing device and configured to interact with a user via the user interface;

selecting a type of circuit to be synthesized;

selecting a circuit approximation;

rendering a circuit performance prediction via the design tool and programmable computing device based at least in part on a circuit parameter; and

dynamically interacting with the circuit performance prediction via the user interface to adjust the circuit parameter.

25.   The method of claim 24 wherein selecting a type of circuit comprises selecting a type of filter, selecting a circuit approximation comprises selecting a filter approximation, and rendering comprises rendering a filter performance prediction.

26.   The method of claim 25 wherein the filter performance prediction is correlated with at least one of a filter specification and a filter parameter.

27.   The method of claim 26 further comprising entering a desired value for at least one of the filter specification and the filter parameter via the user interface to the design tool.

28.   The method of claim 27 wherein dynamically interacting with the circuit performance prediction comprises observing performance of a new filter performance prediction resulting from entering the desired value.

29.   The method of claim 27 wherein entering a desired value comprises dragging a filter parameter line on a Bode plot of the filter performance prediction to a desired value.

30.   The method of claim 29 wherein the filter parameter line corresponds with at least one of ripple, overall gain, corner frequency, filter response, stop frequency, and attenuation on the Bode plot for the filter performance prediction.

31.   The method of claim 27 wherein the filter specification is a graphical representation of the complex pole-zero plane.

32.   The method of claim 31 wherein dynamically interacting with the circuit performance prediction comprises dragging the position of at least one of the poles and zeros in the graphical representation and observing the resultant filter performance prediction.

33.   The method of claim 32 wherein the resultant filter performance prediction comprises at least one of a Bode plot and a step response plot in addition to the graphical representation of the complex pole-zero plane.

34. The method of claim 27 wherein the filter parameter is a step response plot represented in the time domain.

35. The method of claim 34 wherein dynamically interacting with the circuit performance prediction comprises dragging a filter parameter line on the step response plot.

36. The method of claim 35 wherein dragging the filter parameter line to a new position on the step response plot comprises manipulating position of a line which defines a desired limit of at least one of rise time, settling time, slew rate, decay rate, and overshoot.

37. The method of claim 25 wherein the type of filter comprises one of a low pass filter, a high pass filter, a band pass filter, and a band stop filter.

38. The method of claim 25 wherein the filter approximation comprises one of a Butterworth approximation, a Chebyshev approximation, an inverse Chebyshev approximation, an elliptic approximation, and a Bessel approximation.

39. The method of claim 24 wherein the circuit parameter is a graphical representation of a Nyquist limit of a clocked system.